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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,456	12/09/2003	Alexander Reznik	I-2-0473.1US	4668

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EXAMINER	
TORRES, JUAN A	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/731,456	REZNIK ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7-11,16 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-3,7-11,16 and 21* is/are rejected.

7)☒ Claim(s) *10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings were received on 12/09/2003. These drawings are accepted by the Examiner.

Claim Rejections - 35 USC § 112

In view of the amendment filed on 02/22/2005, the Examiner withdraws the 35 USC § 112 rejections to claims 6-8 of the previous Office Action.

Response to Arguments

Applicant's arguments filed on 02/22/2005 with respect to claims 1-3 and 7-10 have been fully considered but they are not persuasive.

The Applicant contends, "The present invention discloses a technique for detecting high data rate data using a first data detector, such as a blind minimum means square error detector, canceling that contribution of the detected data from the received signal and using a second data detector, such as a matched filter or a RAKE-receiver. This technique provides advantages over the prior art.

With respect to the first detector, the complexity of high data rate receivers, such as blind minimum means square error detectors, is based on the number of data signals processed at a time. These detectors tend to cancel all of the user signals simultaneously. The present invention reduces the complexity by not processing the voice signals in these detectors and accordingly, reduces the complexity involved in the processing. Although these receivers could be used to also process the voice signals, the cost for doing so would be increased complexity. After canceling the contribution of

these signals from the received vector, the resulting interference cancelled signal has most of the multiuser interference cancelled from the signal. As a result, lower quality data detectors, such as match filters or a RAKE-receiver, can be used to recover data efficiently from the interference canceled signal.

None of the prior art discloses such an arrangement. With respect to U. S. Patent No. 6,128,486 (Keskitalo et al.), this reference discloses interference cancellation of a highest magnitude and direction signal. However, it does not disclose using two different types of data detectors as recited in the claims for the different signal types".

The Examiner disagrees and asserts, that, as indicated in the previous office action, Keskitalo et al. clearly disclosed the use of two different types of data detectors in fig. 6 blocks 604 and 606 and Keskitalo in his disclosure indicates (column 3 lines 7-15), *inter alia*, "first detector means and second detector means the input of which comprises a signal from the radio-frequency parts and the output signal of the switching matrix, which means perform the signal detection and estimation by utilizing a number of signal components received from the different terminal equipments, and control means which select and guide, by means of the switching matrix, the signals to be utilized on the basis of their incoming direction from the first detector means to the second detector means". Keskitalo in figure 6 block 604, is the first detector denoted as IDET, and block 606 is the second detector denoted as SDET. In Keskitalo doesn't disclose that both detectors are the same kind of detector. Keskitalo discloses an example of the detail of the first detector in Fig. 7 and the detail of the second detector in Fig. 8 and 10 and they are clearly different.

The Applicant contends, "With respect to U. S. Patent Publication No. US 2002/0057730 A1 (Karlsson et al.), this reference discloses a subtractive interference cancellation block. However, that does not disclose two different data detectors are used. Contrarily, it implies that the same type of data detector would be used for the subtractive interference cancellation. Although the Applicants are somewhat confused with the support for the two different data detectors as cited in the Office Action as being found in Karlsson, Applicants believe that the Examiner is equating the decoding with a data detecting as recited in the claims. In the present application, a first data detector detects one group of signals, has the interference cancelled from it and then detects the remaining group of signals. In the Karlsson reference, all of the data signals are detected during the subtractive interference cancellation and the detected data is decoded".

The Examiner disagrees and asserts, that, as indicated in the previous office action, Karlson clearly discloses two different data detectors are used (fig 6 and 8, a non-zero rate SF detector and a zero-rate SF detector) As indicated in the previous Office Action Karlson discloses the use of blind MLS detector (fig. 19 paragraph [0196]) and a matched filter detector (fig. 4 and fig. 8 blocks 816 and 814) and Karlson also discloses the use of RAKE-receiver as a detector (fig. 18 paragraph [0180]).In Karlson reference the signals are clearly detected befor the substractive cancellation in the two detectors (located in block "600 or 800", as shown in fig. 6 and 8) and after that is the subtractive cancellation (block 1500).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 1 of claim 10 the recitation "claim 7 9" is vague and indefinite; it is not clear if claim 10 will depend of claim 7 or of claim 9.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 7-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Karlsson et al. (US Patent Application Publication US 20020057730).

As per claim 7 Karlsson discloses method for multiuser detection of a received signal, the received signal including voice signals and data signals, the method comprising the steps of storing the received signal (figure20 block 2004 page 13 paragraphs [0198] and [0199]); detecting the data signals and extracting the data signals from the received signal (figures 6 and 8 and figure 20 block 600 OR 800 page 13 paragraphs [0198] and [0199]); outputting the extracted data signals as soft symbols (figures 6 and 8 and figure 20 block 600 OR 800 page 13 paragraphs [0198] and [0199]); converting the soft symbols into hard symbols (figures 6 and 8 and figure 20

block 600 OR 800 page 13 paragraphs [0198] and [0199]); canceling the hard symbols from the stored received signal to extract the voice signals (figure 20 block 1500 page 13 paragraphs [0198] and [0199]); and detecting the individual voice signals, wherein the first and second detecting steps are performed by different types of detectors (figures 6 and 8 and figure 20 block 600 OR 800 page 13 paragraphs [0198] and [0199]).

As per claim 8 Karlsson discloses a first detector is a blind minimum mean square error detector (figure 20 block 600, page 13 paragraph [0196]).

As per claim 9 Karlsson discloses a second detector is a matched filter (figure 8 block 816 and 814, page 5 paragraph [0072]).

As per claim 10 Karlsson discloses a second detector is a RAKE-receiver (figure 18 block 1826, page 5 paragraph [0180]).

Claims 11, 16 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Buzzi et al. ("Blind Adaptive Multiuser Detection for Asynchronous Dual-Rate DS/CDMA Systems" IEEE journal on Selected Areas in Communications Vol. 19 No. 2 pp. 233-244 February 2001).

As per claim 11 Buzzi et al. disclose a receiver comprising an antenna for receiving a plurality of communication signals of differing power levels, the plurality of communication signals including a high power level group of signals and a low power level group of signals (figure 6 page 241); a high data rate data detection device for detecting data of the high power level group of signals (figure 5 page 240); an interference canceling device for receiving the detected data of the high power level

group of signals and canceling a contribution of the high power level group detected data from the plurality of communication signals, as an interference canceled signal (page 234 equation 3, figure 5 page 240); and a low data rate data detection device for detecting data of the low power level group of signals from the interference canceled signal (page 234 equation 3, figure 5 page 240); where the high data rate data detection device comprises a blind minimum means square error data detection device (page 236 section IV and figure 3) and the low data rate data detection device comprises a matched filter (page 235 second paragraph).

As per claim 16 Buzzi et al. disclose means for receiving a plurality of communication signals of differing power levels, the plurality of communication signals including a high power level group of signals and a low power level group of signals (figure 6 page 241); means for detecting data of the high power level group of signals (figure 5 page 240); high power level means for receiving the detected data of the high power level group of signals and canceling a contribution of the high power level group detected data from the plurality of communication signals, as an interference canceled signal (page 234 equation 3, figure 5 page 240); low power level means for detecting data of the low power level group of signals from the interference canceled signal (page 234 equation 3, figure 5 page 240); where the high power means comprises a blind minimum means square error data detection device (page 236 section IV and figure 3); and the low power means comprises a matched filter or a RAKE-receiver (page 235 second paragraph).

As per claim 21 Buzzi et al. disclose an input for receiving a plurality of communication signals of differing power levels, the plurality of communication signals including a high power level group of signals and a low power level group of signals (figure 6 page 241); a high data rate data detection device for detecting data of the high power level group of signals (figure 5 page 240); an interference canceling device for receiving the detected data of the high power level group of signals and canceling a contribution of the high power level group detected data from the plurality of communication signals, as an interference canceled signal (page 234 equation 3, figure 5 page 240); a low data rate data detection device for detecting data of the low power level group of signals from the interference canceled signal (page 234 equation 3, figure 5 page 240) where the high data rate data detection device comprises a blind minimum means square error data detection device (page 236 section IV and figure 3) and the low data rate data detection device comprises a matched filter or a RAKE-receiver (page 235 second paragraph).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. (US Patent Application Publication US 20020057730), and further in view of Keskitalo et al. (US 6128486).

As per claim 1 Karlsson discloses a system for multiuser detection of a received signal, the received signal including voice signals and data signals, said system comprising a first detector having an input to receive the received signal and an output, said first detector extracting the data signals from the received signal (figure 20 block 600, page 13 paragraph [0198]); a hard decision converter having an input connected to said first detector output and an output, said hard decision converter converting soft symbols output by said first detector into hard symbols (figure 20 block 600, page 13 paragraph [0198]); an interference canceller having a first input configured to receive the received signal and a second input connected to said hard decision converter output, and an output, said interference canceller canceling a contribution of the data signals from the received signal (figure 20 block 15000, page 13 paragraph [0199]) and a second detector (figures 6 and 8 and figure 20 block 600 OR 800 page 13 paragraphs [0198] and [0199]) the second detector extracting individual voice signals the second detector being a different detector type than said first detector (figure 20 block 600, page 13 paragraph [0198]) and that the first detector is a blind minimum mean square error detector (figure 20 block 600, page 13 paragraph [0196]) and the second detector is a matched filter (figure 8 block 816 and 814, page 5 paragraph [0072]) or a RAKE-receiver (figure 18 block 1826, page 5 paragraph [0180]). Karlsson doesn't disclose that the second detector having an input connected to said interference canceller output. Keskitalo discloses that the second detector having an input connected to the interference canceller output (figure 6 blocks 608 and 606 column 7 lines 1-16). Karlsson and Keskitalo are analogous art because they are from the same field of

endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the receiver disclosed by Karlsson the conexion of the interference canceller to the second detector as disclosed by Keskitalo. The suggestion/motivation for doing so would have been to simplify the baseband processing in the interference cancellation and in multi-user detection and thus to improve the capacity or sensitivity of the detector (Keskitalo column 2 lines 53-55). Therefore, it would have been obvious to combine Karlsson with Keskitalo to obtain the invention as specified in claim 1.

As per claim 2 Karlsson discloses a data buffer having an input to receive the received signal and an output coupled to the first input of the interference (figure 20 block 2004, page 13 paragraphs [0198] and [0199]). Karlsson and Keskitalo are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the receiver disclosed by Karlsson the conexion of the interference canceller to the second detector as disclosed by Keskitalo. The suggestion/motivation for doing so would have been to simplify the baseband processing in the interference cancellation and in multi-user detection and thus to improve the capacity or sensitivity of the detector (Keskitalo column 2 lines 53-55). Therefore, it would have been obvious to combine Karlsson with Keskitalo to obtain the invention as specified in claim 2.

As per claim 3 Keskitalo discloses that the first detector output is connected to a symbol processing device (figure 7 block 708, column 8 line 14-26); and the second detector output is connected to a symbol processing device (figure 8 block 812, column

8 line 66 to column 9 line 5). Karlsson and Keskitalo are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate in the receiver disclosed by Karlsson the conexion of the interference canceller to the second detector as disclosed by Keskitalo. The suggestion/motivation for doing so would have been to simplify the baseband processing in the interference cancellation and in multi-user detection and thus to improve the capacity or sensitivity of the detector (Keskitalo column 2 lines 53-55). Therefore, it would have been obvious to combine Karlsson with Keskitalo to obtain the invention as specified in claim 3.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres
04-06-2005

M. G/—

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER